

Pathology

Departmental Objectives

After completion of pathology course, undergraduate medical students will be able to:

- Explain basic mechanism of diseases: Etiology, pathogenesis, morphological changes with emphasis on common diseases prevalent in Bangladesh.
- Co-relate between clinical findings and pathological changes.
- Chalk out simple investigation plan for diagnosis and follow up of diseases.
- Interpret laboratory results and understand their implication.
- Demonstrate knowledge about the use of Histopathology, FNAC, Cytological examination, Pap smear, Frozen section and Immuno-histochemistry
- Develop attitude for further learning of the subject.
- Develop skills to perform
 - TC, DC, Eosinophil count, estimation of Hb% and ESR , Platelet count.
 - Semen analysis
 - Routine examination of Urine
 - Microscopic examination of body fluids
 - CSF examination
 - Preparation of preservative and fixative- 95% Alcohole, 10% Formaline.
 - Writing a requisition form for histo-pathological and cytological examination

List of Competencies to acquire:

1. Writing a histo-pathological requisition form
2. Preservation of surgical specimens in Upazila health complexes and district hospitals and preparation of fixative for surgical specimens in 10% formalin
3. Sending of surgical specimens from Upazila health complexes and district hospitals to nearby medical college and larger hospitals where histopathology service is available
4. Collection of Paps' smear/ FNAC from superficial mass lesions
5. Preservation of cyto-pathological smears
6. Sending of cytopathology specimens from Upazila health complexes and district hospitals to nearby medical college and larger hospitals where histopathology and cytopathology service is available
7. Preservation of surgical specimens for immunohistochemistry and immunofluorescence
8. Writing a requisition form for immunohistochemistry or immunofluorescence examination
9. Determination of Hb%, ESR, TC & DC of WBC, total count of eosinophil, BT and CT, Platelet count. preparation of stain and comment on PBF.
10. Performing routine urinary examination at health complexes
11. Handling and maintenance of Microscope
12. Performing semen analysis

13. Performing microscopic examination of fluid-CSF
14. Interpretation of pathology reports and data
15. Writing advice for pathological investigations

Distribution of teaching - learning hours and days

Lecture	Tutorial	Practical	Total Teaching hours	Integrated teaching hour for Phase II	Formative Exam		Summative exam	
					Preparatory leave	Exam time	Preparatory leave	Exam time
95 hours	94 hours	34 hours	223 Hours	15 hours	10 days	15 days	10 days	15 days
<i>Time for examination preparatory leave and formative & summative assessment is common for all subjects of the phase)</i>								
Related behavioral, professional & ethical issues will be discussed in all teaching learning sessions								

Teaching-learning methods, teaching aids and evaluation

Teaching Methods				Teaching aids	In course evaluation
Large group	Small group	Self learning	Others		
Lecture	Tutorial Practical	Assignment, Self study	Integrated Teaching	Computer & Multimedia Chalk & board White board & markers OHP Slide projector Flip Chart Models Specimens Projector Online media Study guide & manuals. etc.	<ul style="list-style-type: none"> • Item Examination • Card final (written) • Term final (written, oral+ practical)

2nd Professional Examination:

Marks distribution of Assessment of Pathology:

Total marks – 300

- Written=100 (MCQ (SBA+MTF) 20+(SAQ+SEQ) 70 + Formative Assessment Marks- 10)
- Structured Oral Examination= 100
- Practical and OSPE =100

Related Equipments:

Bino-ocular and teaching microscope, Microscope with projection, (magnified) system, Centrifuge machine, Colorimeter, Spectrophotometer, Auto-analyser, Incubator, Balance, Water bath, Cell Counter, Autoclave, Computer, Electrolyte and gas analyzer, Elisa reader, Haemocytometer, haemometer, Westergren ESR tube, ESR stand, Ayer's spatula, Coplin's jar, Microtome, Cryostat machine etc.

Contents of Term –I and Term -II

Term- I will include all chapters of GP, fluid and electrolyte imbalance covering acid base balance, electrolyte disorders, Carbohydrate metabolic disorders, including hypo and hyperglycemia, lipid metabolic disorder, hematopathology and lymphoreticular system, examination of body fluid, obesity.

Term –II will cover the systemic pathology. Different item of clinical pathology will be incorporated in the relevant chapter of systemic pathology, such as urine examination and KFT can be included in renal system, semen analysis in male genital system, LFT in HBS, CSF examination in CNS.

Learning Objectives and Course Contents in Pathology
Term I A- General Pathology, Haematolymphoid System (Term-1A)

Learning Objectives	Contents	Teaching hours
<p>Introduction to pathology: Students will be able to</p> <ul style="list-style-type: none"> • define pathology and its different branches • define aetiology, pathogenesis and morphology 	<p>Introduction to pathology: Core:</p> <ul style="list-style-type: none"> • Introduction to different branches of pathology • Definition of aetiology, morphology and pathogenesis 	<p>L = 1 T = 1 P = 0</p>
<p>Cell injury: Student will be able to:</p> <ul style="list-style-type: none"> • define reversible and irreversible injury. • identify the causes of cell injury. • describe the mechanisms of reversible and irreversible injury. • define cellular swelling and fatty change. • define necrosis and apoptosis. • describe types of necrosis and cite examples. • describe the morphological changes in necrosis and apoptosis. • describe the mechanism of different types of necrosis including gangrene • describe clinical effects of tissue necrosis. 	<p>Cell injury: Core:</p> <ul style="list-style-type: none"> • Cause of cell injury • Reversible and irreversible injury: mechanism • Mechanism of hypoxic injury • Name of free radical , target of free radical and scavenging system (name of the anti-oxidant), definition of reperfusion injury • Definition of necrosis and apoptosis, types of necrosis and morphologic feature with examples <p><u>Additional:</u></p> <ul style="list-style-type: none"> • Mechanism of free radical injury and reperfusion injury, apoptosis • Consequences of mitochondrial dysfunction and loss of calcium homeostasis 	<p>L = 2,3,4 T = 2,3 P = 0</p>
<p>Pigments and calcification Students will be able to:</p> <ul style="list-style-type: none"> • Define Hyaline changes, pathological calcification, Intracellular accumulation. 	<p>Pigments and calcification Core:</p> <ul style="list-style-type: none"> • Pathological calcification- dystrophic and metastatic: definitions with examples. • Different intracellular pigmentation particularly their name <p><u>Additional:</u> Mechanism of calcification</p>	<p>L = 5 T = 3</p>

Learning Objectives	Contents	Teaching hours
<p>Acute Inflammation Student will be able to :</p> <ul style="list-style-type: none"> • define inflammations • describe the sequence of vascular changes • define exudates and transudate and their mechanism of formation, clinical significance • describe the acute inflammatory cells and their functions. • name the various types of chemical mediators and their role • describe morphological types of inflammation • describe the local and general clinical features of acute inflammation • explain the local and general body response in acute inflammation • list the hazards and complications of acute inflammation. • explain the various fates of acute inflammation 	<p>Acute Inflammation Core:</p> <ul style="list-style-type: none"> • Causes and cardinal signs or features of acute inflammation; • Vascular and cellular events Chemical mediators and their function • Morphological patterns of acute inflammation • Out come of acute inflammation • Local and systemic effect of acute inflammation <p>Additional:</p> <ul style="list-style-type: none"> • Recruitment of leukocytes • Role of complement , coagulation and kinin system • Mechanism of neutrophil recruitment • Recognition of microbes and dead tissue • Defects in leukocyte function • How the chemical mediator works 	<p>L = 6,7,8,9 T = 4,5 P = 1</p>
<p>Chronic inflammation: Student will be able to:</p> <ul style="list-style-type: none"> • define chronic Inflammation • describe the characteristic features and types of chronic Inflammation • define granuloma • mention a etiological classification of granuloma with example • describe the morphological features of tubercular granuloma • describe clinical implications of chronic inflammations. 	<p>Chronic inflammation: Core:</p> <ul style="list-style-type: none"> • Cause • Difference with acute inflammation • Role of macrophage • Examples of granulomatous lesion • Type of granuloma • Mechanism of granuloma <p>Additional- Giant cells</p>	<p>L = 10 T = 6 P = 2</p>

Learning Objectives	Contents	Teaching hours
<p>Repair and healing: Student will be able to:</p> <ul style="list-style-type: none"> • Define healing, repair and regeneration • Describe the mechanisms of primary and secondary wound healing • Distinguish the differences between healing by first and secondary intention • List the local and general factors influencing healing • List the complications of wound healing 	<p>Repair and healing: Core:</p> <ul style="list-style-type: none"> • Definition of healing, repair and regeneration • Steps of cutaneous wound healing, • Factors influencing wound healing • Complications of wound healing, • Fracture healing • Nerve regeneration <p>Additional:</p> <ul style="list-style-type: none"> • Stem cell • Growth cycle • Extracellular matrix 	<p>L = 11,12 T = 7</p>
<p>Edema and electrolyte disorder Student will be able to:</p> <ul style="list-style-type: none"> • define oedema and classify oedema • describe the pathogenesis and mechanism of inflammatory and noninflammatory oedema • describe various types of clinical oedema a) Cardiac b) Hepatic, c) Renal, d) Pulmonary, e) Nutritional • explain the clinical significance of oedema 	<p>Edema and electrolyte disorder Core:</p> <ul style="list-style-type: none"> • Pathophysiology of oedema • Mechanism of oedema in cirrhosis, renal disease and heart failure • Examination of body fluids such as pleural effusion, ascitic fluid • Electrolyte disorder: causes of metabolic acidosis, metabolic alkalosis, respiratory acidosis & respiratory alkalosis <p>Additional:</p>	<p>L = 13, 14 T = 8</p>
<p>Student will be able to:</p> <ul style="list-style-type: none"> • define hyperaemia, congestion and hemorrhage • describe different types of hemorrhage and effects of acute and chronic haemorrhage • explain the mechanism of hyperaemia and congestion • describe the tissue changes of passive venous congestion of liver and lung. • define shock • list the different types of shock • describe the pathophysiology of shock with its various stages. 	<p>Hyperemia, congestion and haemorrhage and Shock Core:</p> <ul style="list-style-type: none"> • Definition of hyperaemia, congestion and haemorrhage • Cause of passive Congestion in lung and liver • Shock: type, pathogenesis of septic shock, stages <p>Additional:</p> <ul style="list-style-type: none"> • Morphology of passive congestion in lung and liver • Mechanism of compensation in shock 	<p>L = 15,16 T = 9,10 P= 3</p>

Learning Objectives	Contents	Teaching hours
<p>Thrombosis and embolism: Student will be able to:</p> <ul style="list-style-type: none"> • define thrombosis and thrombus • describe the pathogenesis of thrombosis • describe morphology of thrombus , difference with post mortem clot • list the effects of thrombi, DIC • list the fate of a thrombus 	<p>Thrombosis and embolism: Core:</p> <ul style="list-style-type: none"> • Mechanism of thrombosis • fate of thrombus, • Clinical consequence of venous thrombosis, arterial and cardiac thrombosis • DIC 	<p>L = 17 T = 11,12</p>
<p>Embolism and infarction Student will be able to:</p> <ul style="list-style-type: none"> • define embolism • list types of emboli • describe the pathogenesis of pulmonary and systemic embolism and their effects • list the fates of emboli • define infarct and infarction • describe the pathogenesis of infarction • list different types and common sites of infarct • describe morphological changes and fate of an infarct 	<p>Embolism and infarction Core:</p> <ul style="list-style-type: none"> • Definition of embolism • Pulmonary embolism: source and consequence • Systemic thromboembolism: source and consequence • Air embolism, fat embolism, amniotic fluid embolism: source and consequence • Infarct: definition, types, factors influencing the formation of infarct 	<p>L = 18 T = 11,12</p>
<p>Growth disturbance and adaptive change Student will be able to:</p> <ul style="list-style-type: none"> • define cellular adaptation • list the different types of cellular adaptations • describe the pathogenesis and morphological features of different types of cellular adaptations. 	<p>Growth disturbance and adaptive change Core:</p> <ul style="list-style-type: none"> • Adaptive change • Definitions and examples of atrophy, metaplasia, hypertrophy, hyperplasia <p>Additional : Mechanism of the adaptive changes</p>	<p>L = 19 T = 13 P = 4</p>

Learning Objectives	Contents	Teaching hours
<p>Neoplasia Student will be able to:</p> <ul style="list-style-type: none"> • define neoplasia and different tumor like conditions • classify tumors • list the characteristic features of benign and malignant tumors • list the characteristic features of carcinoma and sarcoma • describe the mechanism of spread of malignant tumors • classify & enlist the different carcinogens. • describe the parameters required for grading and staging of malignant tumors • describe the significance of grading and staging • list the precancerous conditions • explain the difference between invasive carcinoma, carcinoma in situ, locally malignant tumors, latent cancer and dormant cancer. • list clinical effects of neoplasia. • list the various methods in the laboratory for diagnosis of cancer. • describe briefly principles of histo-pathological examination, cytological examination, tumor markers and immunocyto/ histochemistry. 	<p>Neoplasia Core:</p> <ul style="list-style-type: none"> • Definition and characteristics of neoplasia • Nomenclature • Features of benign and malignant tumour • Spread of tumour • Genetic predisposition of cancer • Example of proto-oncogene, cancer suppressor gene • Precancerous conditions <p>Additional:</p> <ul style="list-style-type: none"> • Molecular basis of cancer • Multiple step of carcinogenesis, 	<p>L = 20,21,22,23 T = 14,15 P = 5,6,7</p>
<p>Carcinogenesis Student must be able to</p> <ul style="list-style-type: none"> • list the major chemical carcinogens, radiant carcinogens and biological carcinogens • explain the initiation and promotion of carcinogenesis. 	<p>Carcinogenesis Core:</p> <ul style="list-style-type: none"> • Chemical carcinogen: classification • Tumour: initiation and promotion • Microbiological carcinogen: name and the cancer associated with them • Name of the radiant energy and the cancer associated with them <p>Additional: Mechanism of the carcinogenesis of the viruses and radiant energy particularly of HPV and EBV and H pylori</p>	<p>L = 24, 25, T = 16</p>

Learning Objectives	Contents	Teaching hours
<p>Tumor immunity and clinical aspects of neoplasia and laboratory diagnosis of tumor Student will be able to:</p> <ul style="list-style-type: none"> • define tumor antigen and immune surveillance • name the antitumor mechanism • list the local and systemic effect of cancer • mention the basis of grading and staging of tumor • give an out line of the laboratory diagnosis of cancer 	<p>Tumor immunity and clinical aspects of neoplasia and laboratory diagnosis of tumor Core:</p> <ul style="list-style-type: none"> • Tumor antigen • Antitumor mechanism • Immune surveillance • Cancer cachexia • Paraneoplastic syndrome • Grading and staging of tumor : basis and their use • Laboratory diagnosis: role of FNAC, cytological examination, pap smear, frozen section and immunohistochemistry <p>Additional:</p> <ul style="list-style-type: none"> • Mechanism of immune surveillance • Paraneoplastic syndrome • Molecular diagnosis of cancer 	<p>L = 26 T = 17</p>
<p>Genetics Student will be able to:</p> <ul style="list-style-type: none"> • explain the basic concepts of inheritance. • classify the different genetic disorders. • 	<p>Genetics Core:</p> <ul style="list-style-type: none"> • Basic definitions, mutation, type, • Classification of genetic disease, • Mendelian disorder: characteristics and examples, • features of down syndrome, turner syndrome and Klinefelter syndrome and hermaphrodite • Name of the tools for diagnosis of genetic disease- karyotype, FISH, PCR. <p>Additional:</p> <ul style="list-style-type: none"> • Biochemical and molecular basis of single gene disorder, lysosomal storage disease • Single gene disorder non-classical inheritance • Indications of prenatal diagnosis 	<p>L = 27,28 T = 18</p>

Learning Objectives	Contents	Teaching hours
<p>Immunopathology Student will be able to:</p> <ul style="list-style-type: none"> Describe the basic mechanism of immunological disorders – hypersensitivity, autoimmune disease, immunodeficiency 	<p>Immunopathology Core:</p> <ul style="list-style-type: none"> Name of immune deficiency diseases Autoimmune diseases: name of the organ specific auto immune diseases and the basic pathogenesis (name of the antibody) Name of the diagnostic tools 	<p>L = 29, 30 T = 19</p>
<p>Infectious Disease Student will be able to:</p> <ul style="list-style-type: none"> Describe & classify the diseases caused by environmental hazards and infectious disease 	<p>Infectious Disease Core:</p> <ul style="list-style-type: none"> Lesions produced by tuberculosis, leprosy and syphilis Name of the diagnostic tools 	<p>L = 31 T = 19</p>
<p>Nutritional disorders Student will be able to :</p> <ul style="list-style-type: none"> define and briefly describe PEM, Kwashiorkor, Marasmus & vitamin deficiencies with their clinical consequence 	<p>Nutritional disorders Core:</p> <ul style="list-style-type: none"> Bone changes in deficiency states Features of vitamin A, Vit B₁₂ and folic acid deficiency <p>Additional:</p> <ul style="list-style-type: none"> Iron metabolism Vitamin A and D metabolism Vitamin B₁₂ and folic acid deficiency mechanism 	<p>L = 32,33 T = 20</p>
<p>Environmental diseases and hazards Student will be able to :</p> <ul style="list-style-type: none"> describe and classify the diseases cost by environmental hazards 	<p>Environmental diseases and hazards Core:</p> <ul style="list-style-type: none"> Diseases associated with smoking, arsenicosis, radiation hazard 	<p>L = 34,35 T = 20</p>

Total teaching hour in General Pathology (Term I A)

Lecture : 35 Hours

Tutorial : 20 X 2 = 40 Hours

Practical : 07x 1 = 07 Hours

Total teaching hours of General Pathology = 82 Hours

Term-1B - General Pathology, Haematolymphoid System (Term-1B)

<p>Lymphoreticular Student will be able to:</p> <ul style="list-style-type: none"> list the causes of lymphadenitis and describe the morphological features. classify Hodgkin and non-Hodgkin lymphomas. describe the morphological features of Hodgkin's and non-Hodgkin lymphoma and correlate with clinical course. 	<p>3. Lymphoreticular Core:</p> <ul style="list-style-type: none"> Causes of lymphadenopathy, Outline of classification of NHL Hodgkin and non-Hodgkin lymphomas : Classification, morphology <p>Additional:</p> <ul style="list-style-type: none"> Immune diagnosis of Hodgkin lymphoma Burkitt lymphoma: morphology Follicular lymphoma: morphology Causes of splenomegaly 	<p>L = 36,37 T = 21 P = 8</p>
<p>Student will be able to:</p> <ul style="list-style-type: none"> describe main findings in a peripheral blood film. state the indications of bone marrow examination and describe normal bone marrow findings. state normal haemoglobin level with age & sex variations and red cell indices (MCV, MCH , MCHC) define and classify anaemia based on morphology and aetiology list the causes of iron deficiency anaemia and state the laboratory investigations. list the causes of megaloblastic anaemia and other conditions that leads to macrocytosis. describe laboratory investigations for megaloblastic anaemia classify haemolytic anaemia. describe the findings on peripheral blood film and list further investigations to identify its aetiology. list different types of haemoglobino-pathies and thalassaemia describe the pathogenesis of sickle cell anaemia and thalassaemia. list the causes of pancytopenia and describe peripheral blood film findings and bonemarrow findings of aplastic anaemia. list the causes of haemorrhagic disorders and interpret its screening lists. discuss haemophilia and ITP define leukaemia, classify leukaemia and describe peripheral blood film and bone marrow findings in different leukaemias. explain leukaemoid reactions. define polycythemia and classify it. define paraproteinaemia and describe the laboratory investigations of multiple myeloma 	<p>4. Hematopathology Core:</p> <ul style="list-style-type: none"> Hematopoiesis, different stages of RBC and WBC Causes of Leukocytosis, leucopenia, eosinophilia, monocytosis and thrombocytopenia Anemia: morphological and etiological classification Lab. diagnosis of nutritional anemia, iron deficiency anemia, megaloblastic anemia, pernicious anemia Hemolytic anemia: classification Thalassemia and sickle cell anemia: lab diagnosis Aplastic anemia: etiology and lab diagnosis PNH, AIHA, Coombs test Classification of bleeding disorder ITP: causes and lab diagnosis Hemophilia: causes and lab. investigation Leukemia: classification and lab.diagnosis CGL Multiple myeloma: lab. Diagnosis <p>Additional :</p> <ul style="list-style-type: none"> Constituents of blood and bone marrow Polycythemia <p>Blood Group and blood transfusion Core:</p> <ul style="list-style-type: none"> Blood transfusion: grouping and cross matching, transfusion reaction, blood transmissible disease, Rh incompatibility, Blood transfusion products <p>LECTURE ON INTERPRETATION OF RESPECTIVE REPORTING Instruments demonstrations</p>	<p>L = 38-47 T = 22-27 P = 9-15</p> <p>L = 48,49 T = 28,29</p> <p>L = 50 P=16</p>

Total teaching hour in Haematolymphoid Pathology (Term-1B)

Lecture : 15 Hours

Tutorial : 9X 2 = 18 Hours

Practical : 08x 1 = 08Hours + 1 Hours (Instruments)

Total teaching hours of Haematolymphoid Pathology = 42 Hours

Integrated teaching = 05 Hours

(Term 1A- 82 Hours + Term 1B- 42 Hours =124 Hours)

Term-2A - Systemic Pathology (Term-2A)

Learning Objectives	Contents	Teaching hours
<p>Blood vessels Student will be able to :</p> <ul style="list-style-type: none"> • define arteriosclerosis and atherosclerosis • list the risk factors and discuss the pathogenesis of atherosclerosis • list the sites of involvement of atherosclerosis. • describe the complications of atherosclerosis. 	<p>1. Blood vessels Core:</p> <ul style="list-style-type: none"> • Name of different vasculitis, and vascular tumor, <p>Core:</p> <ul style="list-style-type: none"> • Define arteriosclerosis and atherosclerosis, aneurysm and dissection, • Risk factors of atherosclerosis, site of involvement and complications • Lipid profile <p>Additional : Pathogenesis of atherosclerosis</p>	<p>L = 1 T = 1</p>
<p>Heart</p> <ul style="list-style-type: none"> • define ischaemic heart disease and describe the types. • describe the pathogenesis of ischaemic heart disease. • describe the morphological features of myocardial infarction. • describe the haematological and biochemical changes in myocardial infarction. • define rheumatic heart disease. • describe the pathogenesis and morphology of rheumatic heart disease. • define infective endocarditis. • define the aetiology and types of infective endocarditis. • define hypertension and list the causes of essential and secondary hypertension. • discuss the pathogenesis and describe the vascular changes in hypertension. 	<p>2. Heart Must know</p> <ul style="list-style-type: none"> • Ischemic heart disease and myocardial infarction : pathogenesis, morphological features and biochemical indicators, complications • Rheumatic fever: pathogenesis, morphology and complications • Infective endocarditis: pathogenesis, morphology and complications • Causes of myocarditis, pericarditis <p>Additional: Names of congenital heart disease.</p>	<p>L = 2,3,4 T = 2 P= 1</p>

Learning Objectives	Contents	Teaching hours
<p>Respiratory System Student will be able to:</p> <ul style="list-style-type: none"> • mention the common inflammatory lung diseases. • define and describe the different types of pneumonia, tuberculosis and lung abscess. • list the causes and describe the pathogenesis of pneumonia, tuberculosis and lung abscess. • describe the morphology and enlist the complication of pneumonia, tuberculosis and lung abscess. • appreciate the clinical course and correlate it with the morphological features. • define the different types of chronic obstructive airway diseases. • describe the pathogenesis, morphological and clinical features of COPD. • classify lung tumours and describe aetiology and pathogenesis. • describe the morphological features and clinical course of common lung tumour. • list the causes of pleuritis and describe the various types of pleural effusion. 	<p>5. Respiratory System Core:</p> <ul style="list-style-type: none"> • Cause of Pulmonary oedema • Define: ARDS, obstructive pulmonary disease and pneumoconiosis • Morphology of obstructive airway disease • Pathogenesis and morphology of Pneumonia • Lung abscess: pathogenesis and morphology • Pulmonary tuberculosis: pathogenesis, morphology, fate • Cause of pleural effusion • Classification of lung tumor <p>Additional:</p> <ul style="list-style-type: none"> • Congenital anomalies • Pathogenesis of obstructive airway disease, name of the granulomatous lesion of lung • Defense mechanism of lung • Definition of restrictive disease • Morphology and clinical effect of lung tumor 	<p>L = 5-9 T = 3,4 P = 2,3</p>

Learning Objectives	Contents	Teaching hours
<p>GIT Student will be able to:</p> <ul style="list-style-type: none"> • define and list the causes of oral ulcer and leucoplakia • list the precancerous, benign and malignant tumour of the oral cavity and identify the predisposing factors. • classify histologically benign and malignant tumours of salivary glands. • list the tumours of oesophagus and describe their morphological features. • list the causes of acute and chronic gastritis. • define peptic ulcer and describe its pathogenesis, morphological features and clinical course. • list the various types of benign and malignant tumours of stomach and identify the predisposing factors for gastric carcinoma. • list the causes of acute appendicitis describe the morphological features and correlate with its clinical course. • name ulcero inflam matory diseases involving intestine. • differentiate ulcerative colitis from crohn's disease. • list the different types of polyp, benign and malignant tumour of intestine. 	<p>6. GIT Core:</p> <ul style="list-style-type: none"> • Leukoplakia, , name of the carcinoma of oral cavity • Salivary gland tumor, morphology of pleomorphic adenoma • Oesophagus:causes of oesophagitis, Barretts oesophagus • Congenital anomalies of GIT – morphology of Hirschprung disease and hypertrophic pyloric stenosis • PU: pathogenesis, morphology, complications • Inflammatory bowel syndrome, difference between crohns and ulcerative colitis • Tumors of stomach • Gastric cancer: morphology and etiopathogenesis • Acute appendicitis Morphology • Ca colon: morphology and etiopathogenesis • Name of the different polyp of GIT <p>Additional:</p> <ul style="list-style-type: none"> • Pathogenesis of IBD • Diverticulosis • Infarction • Necrotizing enterocolitis • Ulcerative lesion of GIT 	<p>L = 10-16 T = 5,6 P = 4,5,6</p>

Learning Objectives	Contents	Teaching hours
<p>Hepato biliary system</p> <p>Student will be able to:</p> <ul style="list-style-type: none"> • list the causes of hepatitis. • describe the various types of viral hepatitis and explain their modes of transmission and state their clinical outcome. • list the causes and describe the morphological features of liver abscess. • list the causes, pathogenesis and complications of cirrhosis. • describe the morphology of cirrhosis and correlate it with clinical features. • list the different types of benign and malignant tumours of liver and describe briefly the epidemiology. • identify the risk factors, describe the pathogenesis, morphological features and complications of cholelithiasis. • list the tumours of gall bladder. 	<p>7. Hepato biliary system</p> <p>Core:</p> <ul style="list-style-type: none"> • Liver function tests & their interpretation • Jaundice: types, differences • Hepatitis: cause, morphology • Cirrhosis: etiology, pathogenesis, morphology and complication • Portal hypertension and hepatic failure: feature • Liver abscess: morphological features • Tumor of liver : types • Cholecystitis and cholelithiasis : etiology, pathogenesis, <p>Additional:</p> <ul style="list-style-type: none"> • Neonatal jaundice • Diseases of exocrine pancreas • Hepatic Cysts 	<p>L =17-22 T = 7,8 P = 7,8</p>

Term-2B - Systemic Pathology (Term-2B)

Learning Objectives	Contents	Teaching hours
<p>Renal system Student will be able to:</p> <ul style="list-style-type: none"> • classify glomerular diseases. • list clinical manifestations of renal diseases. describe briefly aetiology, pathogenesis and clinical course of acute and chronic glomerulonephritis. • define nephrotic syndrome, list its causes and describe the pathophysiology. • define pyelonephritis, list the causes, describe the morphological features, and clinical course of acute and chronic pyelonephritis. • define and list the causes of acute renal failure and discuss briefly its clinical course. • list the different types of renal tumours and discuss briefly the morphological features. • discuss briefly uropathy and renal calculi. • describe different types of cystitis. • list the different types of urinary bladder tumour, describe its pathogenesis and morphological features. 	<p>8. Renal system Core:</p> <ul style="list-style-type: none"> • Classification of renal disease and their clinical manifestation • Renal function test including examination of urine • Immune basis of glomerulonephritis • Classification of glomerulonephritis • Acute post streptococcal glomerulonephritis: etiopathogenesis, morphology, complications • Nephrotic syndrome: definition, causes • Pyelonephritis:etiopathogenesis, morphology and complications • Renal tumour: different types • Renal cell carcinoma • Urinary bladder tumor : different types <p>Additional:</p> <ul style="list-style-type: none"> • Congenital disease of kidney • Polycystic kidney disease • Urolithiasis: Types • Morphology of renal cell carcinoma • Morphology of different types of cystitis 	<p>L = 23-27 T = 9-10 P =9-10</p>
<p>Male genital system Student will be able to:</p> <ul style="list-style-type: none"> • describe types and causes of prostatitis. • outline epidemiology, pathogenesis and morphological features of nodular hyperplasia. • describe types of pathology and methods of diagnosis of prostatic carcinoma • list the causes of orchitis and epididymitis. • classify testicular tumours and describe their morphological features and prognosis. 	<p>9. Male genital system Core:</p> <ul style="list-style-type: none"> • Prostate: causes of prostatitis • Aetiopathogenesis and morphology of nodular hyperplasia • Role of PSA in prostatic carcinoma • Testis • Undescended testis: importance • Inflammatory diseases of testis • Testicular tumor : classification and clinical outcome • Morphology of seminoma, yolk sac tumor and embryonal carcinoma • Tumour markers for testicular tumors • Semen analysis 	<p>L = 28-30 T = 11 P = 11</p>

Learning Objectives	Contents	Teaching hours
<p>Female genital system Student will be able to:</p> <ul style="list-style-type: none"> • list the causes of cervicitis and discuss briefly non-neoplastic lesions of cervix. • identify the risk factor for cervical carcinoma, discuss briefly the precancerous, and cancerous lesions of cervix and methods of diagnosis. • list the causes of endometriosis and discuss briefly neoplastic and non-neoplastic lesions of uterus. • list the non-neoplastic cysts of ovary. • describe ovarian tumours and describe briefly morphological features and clinical course of common tumour. • list the gestational trophoblastic tumours, name the type of hydatidiform mole, describe the morphological features and methods of diagnosis of hydatidiform mole. • identify the predisposing factors and discuss the morphological changes and prognosis of Choriocarcinoma. 	<p>10. Female genital system Core:</p> <ul style="list-style-type: none"> • Causes of cervicitis, salpingitis • Risk factors of cervical cancer • Role of human papilloma virus –screening for cervical cancer • Different histological types of cervical cancer • Endometriosis : possible mechanism , sites and effect of endometriosis • Common tumor of the corpus of uterus : morphology of leiomyoma, • Endometrial hyperplasia : different types, their morphology and importance • Classification of ovarian tumor and role of tumor marker • Morphology of teratoma, dysgerminoma, choriocarcinoma and the different surface epithelial tumor, Krukenberg tumor • Hydatidiform mole and choriocarcinoma predisposing factors, morphology and diagnosis • Pregnancy test 	<p>L = 31-34 T =12-13 P = 12-13</p>
<p>Breast Students will be able to:</p> <ul style="list-style-type: none"> • list the inflammatory diseases of breast. • describe the epidemiology, types and biological importance of fibrocystic disease. • list the benign and malignant tumours of breast, classify malignant breast tumour and discuss the risk factors. 	<p>11. Breast Core:</p> <ul style="list-style-type: none"> • Name of the different inflammatory diseases of breast, cause of lump of breast • Fibrocystic disease: different types and their importance • Classification of breast tumor • Breast carcinoma: risk factors and the prognostic factors • Screening of breast carcinoma 	<p>L = 35,36 T = 14 P = 14</p>

Learning Objectives	Contents	Teaching hours
<p>Endocrine system—thyroid and endocrine pancreas diabetes mellitus Students will be able to:</p> <ul style="list-style-type: none"> • list the causes of thyroiditis and describe briefly Hashimotos thyroiditis. • discuss pathogenesis and clinical course of diffuse and multinodular goitre. • describe the morphological features of goitre. • list the benign and malignant tumors of thyroid. • describe the morphological features of papillary, follicular carcinoma and the prognosis of thyroid tumors. • types of diabetes mellitus, pathogenesis, diagnosis and complications 	<p>12. Endocrine system—thyroid and endocrine pancreas diabetes mellitus Core:</p> <ul style="list-style-type: none"> • Causes of goiter, name of the different auto immune disease of thyroid • Thyroiditis: types and morphology • Different types of thyroid tumor, their morphology and prognosis • Diabetes mellitus : different types, pathogenesis, and complications • Estimation of blood sugar • Glucose tolerance test and its interpretation <p>Additional: Mechanism of ketoacidosis</p>	<p>L = 37-40 T = 14,15 P = 14,15</p>
<p>Student will be able to:</p> <ul style="list-style-type: none"> • define the terms used in dermatology • list common papulo-squamous and visicobullous diseases of skin. • list the benign, premalignant and malignant epidermal tumors • describe briefly the morphological features of squamous cell carcinoma, basal cell carcinoma, malignant melanoma 	<p>13. Skin Core:</p> <ul style="list-style-type: none"> • Terms used in dermatology • Cause of bullous lesions • Name of premalignant and malignant lesions of skin • Basal cell carcinoma, malignant melanoma and squamous cell carcinoma: morphology 	<p>L = 41 T = 16 P = 16</p>
<p>Student will be able to:</p> <ul style="list-style-type: none"> • list the course of acute and chronic meningitis and encephalitis and describe CSF findings in different types of meningitis. • list the benign and malignant tumors of central nervous system and peripheral nerve sheath 	<p>14. CNS Core:</p> <ul style="list-style-type: none"> • Indications of Examination of CSF and the findings in different types of meningitis • Name of the CNS tumor <p>Additional:</p> <ul style="list-style-type: none"> • Changes in cerebral infarction 	<p>L = 42 T = 17 P = 17</p>

Learning Objectives	Contents	Teaching hours
<p>Student will be able to:</p> <ul style="list-style-type: none"> • list the tumors of eye • list the tumors of Nasal Cavity • classify the tumors of soft tissue • describe the pathogenesis of sinusitis/ otitis media • classify tumors of bone • describe causes & pathogenesis of osteomyelitis • list the disease skeletal muscle 	<p>15. Bone, soft tissue, eye and ENT</p> <p>Core:</p> <ul style="list-style-type: none"> • Soft tissue tumor : names • Bone tumor : names and their histogenesis • Osteomyelitis: aetiopathogenesis, morphology • Name of the tumors of eye and nasal cavity <p>Additional:</p> <ul style="list-style-type: none"> • Morphology of retinoblastoma, giant cell tumor of bone, Ewings sarcoma, <p>Lecture on specimen and morphology based on different systems.</p>	<p>L = 43,44 T = 18 P = 18</p> <p>L= 45</p>

Total teaching hour in systemic Pathology (Term 2A+2B);

Lecture- 45x1 = 45 hours

Tutorial- 18 x2 = 36 hours

Practical -18 x1= 18 hours

Total = 99 hours

(Grand total hours= General Pathology -82 Hours+ Haematolymphoid Pathology-42 Hours+Systemic pathology-99 hours= 223 Hours)

Common hour for integrated teaching 15hrs

CLASS PERFORMANCE CARD-1A: GENERAL PATHOLOGY

Sl.No	Name Of The Item	Full Marks	Marks Scored	Signature/Remarks
01.	Introduction of pathology, Histo-cytopathological sample collections, preservation, transport and processing of pathological samples.			
02.	Cellular adaptations: definitions, feature and clinical significance, Intracellular accumulation, calcification, Cellular Aging.			
03.	Cell injury: Definitions, injurious agents, types, reversible cell injury-features and morphology, Mechanism of hypoxic injury and Free radicals.			
04.	Irreversible cell injury-Necrosis & Apoptosis-features, example.			
05.	Inflammation: Definition, causes, cardinal signs, types, acute inflammation- cellular and vascular events; Chemotaxis, Phagocytosis.			
06.	Chemical mediators, morphological patterns of acute inflammation, outcome of acute inflammation, Systemic effects of inflammation.			
07.	Chronic inflammation: Definition, cells of chronic inflammation, Granulomatous inflammation – causes, examples and mechanism.			
08.	Healing and repair: Definition, types, mechanism, factors affecting wound healing, complications of wound healing.			
09.	Haemodynamics: Oedema, effusions, Electrolyte disorders			
10.	Hyperemia, congestion, Haemorrhage, Shock			
11.	Haemostasis, Thrombosis, Embolism, Infarction			
12.	Neoplasia: Definition, Nomenclature, Nature of tumor-Benign, Malignant, Borderline malignancy, Low malignant potential; Incidence & Predisposition.			
13.	Features of malignancy- Anaplasia, invasion, metastasis Molecular aspect of tumor-Oncoprotein, Oncogene, Tumor suppressor gene, cellular & molecular hallmarks of cancer.			
14.	Carcinogenesis- direct & indirect carcinogens, clinical aspects of cancer- cancer cachexia, paraneoplastic syndrome, Grading and staging of cancer.			
15.	Tumor immunity, laboratory diagnosis of cancer			

CLASS PERFORMANCE CARD-1B: HAEMATOLYMPHOID PATHOLOGY

SL. NO	NAME OF THE ITEM	FULL MARKS	MARKS SCORED	SIGNATURE /REMARKS
1.	Genetics: Types-Single Gene Disorders, Chromosomal disorders, Complex Multigenic Disorders. Cytogenic disorders- Down's, Turner's syndrome; Mutation: Definition, causes, types; Diagnosis- Clinical features, Investigations.			
2.	Immunopathology: Definition of Immunity, Types of immunity, Immune disorders- Hypersensitivity, Autoimmune disorders-types, Immunodeficiency disorders-types & causes, Rejection of tissue transplantation			
3.	Nutritional disorders: PEM, Obesity, Vitamins and Mineral deficiency, Childhood tumor and Environmental hazards- Effects of tobacco & alcohol; Occupational hazards- Arsenic, Radiation; Infectious disease-TB, Leprosy, Syphilis.			
4.	Introduction and Terminology: Haematological sample collection, Preservation and processing. Constituents of blood and bone marrow, Haematopoiesis, Types of Hb and RBC indices, PBF, CBC.			

5.	RBC disorder: Anaemia, Classification- aetiological and morphological, Aetiopathogenesis and laboratory diagnosis of Iron deficiency anaemia and Megaloblastic anemia.			
6.	Haemolytic anaemia: Classification: Extracorpuscular and intracorpuscular, Aetiopathogenesis and laboratory diagnosis of Thalassemia, Sickel cell anaemia			
7.	Pancytopenia, Aplastic anemia- aetiopathogenesis and laboratory diagnosis			
8.	WBC disorder: Reactive proliferations- Neutrophilia, leukocytosis, Leukopenia, Eosinophilia, Lymphocytosis,			
9.	Leukaemia and related disorders-Leukaemia, Leukomoid reaction, Subleukaemic leukaemia and Myelodysplastic syndrome			
10.	Lymphoproliferative disorders: Lymphadenitis, Lymphoma- types, morphology of Hodgkin lymphoma and NonHodgkin lymphoma, Multiple myeloma.			
11.	Myeloproliferative disorders: Polycythemia, Myelofibrosis			
12.	Haemorrhagic disorders: Classification, aetiopathogenesis & laboratory diagnosis of ITP, Haemophilia and DIC; Screening tests (BT, CT, APTT, Tourniquet test)			
13.	Blood grouping-Types, Blood products, Screening tests, Hazards of blood transfusion,			

CLASS PERFORMANCE CARD-2A: SYSTEMIC PATHOLOGY

SL.NO	NAME OF THE ITEM	FULL MARKS	MARKS SCORED	SIGNATURE/REMARKS
1.	Blood vessels: Atherosclerosis, vasculitis and tumors, Lipid profile.			
2.	Ischemic heart diseases, hypertensive heart diseases and cardiac enzymes.			
3.	Congenital heart diseases, Rheumatic fever, Infective endocarditis, (Myocarditis, Pericarditis, Cardiomyopathy – Types and causes)			
4.	Respiratory System: Congenital diseases, Inflammatory diseases-TB, Lung abscess, Pneumonia			
5.	Respiratory System: COPD -Emphysema Chronic bronchitis, Bronchial asthma, Bronchiectasis, Bronchogenic carcinoma, Sputum examination			
6.	Urinary system: Congenital kidney diseases, clinical presentation of renal diseases, Glomerular diseases- AGN, NS.			
7.	Urinary system: Tubulo-interstitial diseases, pyelonephritis, Renal calculi and Renal function tests			
8.	Urinary system: Renal tumors & urinary bladder diseases- cystitis and urinary bladder tumors			
9.	GIT: Oral cavity, salivary gland- inflammation, classification of tumors (pleomorphic adenoma), Esophagus-precursor lesions, risk factors and tumors			
10.	Gastritis, Peptic ulcer diseases, gastric carcinoma.			
11.	Small and Large intestine: Congenital diseases, inflammatory bowel diseases, Polyps and ulcers of GIT,			

	Tumors. Acute appendicitis and tumour.			
12.	Hepatobiliary: Acute and Chronic hepatitis -Hepatitis-B & C, viral markers, liver function tests.			
13.	Hepatobiliary- Liver Cirrhosis, Portal hypertension, Hepatic failure & tumors.			
14.	Gall bladder-Calculi, aetiopathogenesis of cholecystitis, inflammation and tumors. Pancreas- Inflammation and tumors			
CLASS PERFORMANCE CARD-2B: SYSTEMIC PATHOLOGY				
15.	Male Genital System: Testis- inflammations and tumors; Semen analysis & Prostate- NHP, Tumors, PSA			
16.	Female Genital System: Vaginal diseases- vaginitis, cyst; Cervix-cervicitis, polyps, CIN, Cervical tumors, PAP smear test			
17.	Female Genital System: Corpus of uterus-DUB, adenomyosis, endometriosis and uterine tumors; placenta; Ovary-cysts and tumors. Pregnancy test			
18.	Breast- Inflammatory & fibrocystic diseases, benign & malignant tumors- epidemiology, risk and prognostic factors; Investigation protocols; IHC-ER, PR, HER-2			
19.	Endocrine: Thyroid- Hypo and hyperthyroidism; Thyroiditis-Hashimoto's thyroiditis, Graves' disease; Tumors- Types, Papillary carcinoma-morphology, Investigation protocols			
20.	Endocrine- Diabetes mellitus, OGTT, Benedicts test.			
21.	Eye & ENT: Tumor, sinusitis, Otitis media. CNS: Inflammation- Meningitis, brain abscess, Brain tumors- Glial tumors and others; Criteria of brain tumors, CSF examination			
22.	Bones: Inflammation-Osteomyelitis, Bone tumors classification-Osteosarcoma; Joints: Rheumatoid arthritis; Soft tissue: Soft tissue tumors			
23.	Skin: Common terms, Inflammation, Blistering diseases, Pigmented skin lesions, premalignant & malignant conditions (SCC, BCC and malignant melanoma)			
24.	An outline of autopsy, techniques in histopathology, gross examination, tissue processing.			
25.	Techniques in Cytopathology- FNAC, Pap smear, fluid cytopathology, miscellaneous.			
26.	Normal, increased and lower values of different haematopathological and chemical pathology investigations			

ORAL EXAMINATION BOX CONTENTS: GENERAL PATHOLOGY

A/1	A/2	A/3	A/4	A/5
Cell injury Cellular adaptation, Necrosis and apoptosis, Intracellular accumulation and pathological calcification	Inflammation, Healing and regeneration, Infectious diseases	Edema, Electrolyte disorders, Thrombosis and Embolism, Hyperemia and Congestion, Shock, Haemorrhage, Infarction, Examination of body fluids	Neoplasia, Childhood tumors	Problem based question on Items of General Pathology Staining, Histopathology slides, Biopsy, FNAC, Frozen section Immunohistochemistry

ORAL EXAMINATION BOX CONTENTS: GENERAL PATHOLOGY AND HAEMATOLYMPHOID SYSTEM

A/6	A/7	A/8	A/9	A/10
Hemopoiesis, Etiopathogenesis and lab diagnosis of iron deficiency anemia and Megaloblastic anaemia, Environmental and Nutritional deficiency disorders	Etiopathogenesis and lab diagnosis of Haemolytic anaemia, Aplastic anaemia, Genetic disorders: Classification, Mutation, Diagnostic tools	WBC disorders- Granulopoiesis Reactive disorders Leukaemia and related disorders Myeloproliferative disorders Polycythaemia, Infectious diseases Immunopathology: Hypersensitivity, Autoimmune disease, Immunodeficiency states	Haemorrhagic disorders Blood grouping and cross matching Blood transfusion products Transfusion reactions	Problem based questions on Haematolymphoid Pathology Practical Hematology: Anticoagulants Hb estimation, ESR, CBC, PBF, BT, CT, PT, Platelet count, Reticulocyte count, Coomb's test Bone marrow examination, Trepine biopsy

ORAL EXAMINATION BOX CONTENTS: SYSTEMIC PATHOLOGY

B/1	B/2	B/3	B/4	B/5
Atherosclerosis, Tumors of blood vessels, Ischaemic heart disease, Infective endocarditis, Myocarditis, Pericarditis and Rheumatic fever- Pathogenesis, morphology and complications Lipid profile Cardiac enzymes	GIT- Peptic ulcer diseases, Ulcers and tumors of GIT, Diarrhoeal diseases, Inflammatory bowel diseases Salivary gland Endoscopic biopsy, Colonoscopy	Hepatobiliary system Viral hepatitis, Cirrhosis of liver, Hepatocellular Carcinoma Jaundice and Liver Function Tests Breast- Inflammation and tumors, Risk factors and prognostic factors, Diagnostic protocol of breast lump Pregnancy test	Urinary system- Primary glomerular diseases, AGN, Nephrotic syndrome, Pyelonephritis, Renal stone, Tumors of kidney and bladder, Causes of uraemia, proteinuria Hematuria and Ketonuria Renal function tests Urine examination	Case history Histopathological Specimens

B/6	B/7	B/8	B/9	B/10
Respiratory system- Pneumonia, Pulmonary Tuberculosis, COPD, Bronchogenic carcinoma, Bronchial asthma Pleural fluid Examination	Male genital system- Testicular tumors, Nodular hyperplasia And tumors of Prostate, Semen analysis Female genital system- Tumors of uterus and ovary, endometriosis	Endocrine system Hypo and hyper Thyroidism Hashimoto thyroiditis, Tumors of thyroid gland Diabetes mellitus and complications	CNS, Eye, ENT, Skin Musculoskeletal system, Bones, Joints and soft tissue tumors Examination of CSF fluid	Problem Based questions of Systemic Pathology Integrated teaching

Case histories-

1. Rheumatic fever
3. Pneumonia
4. COPD
4. Lung carcinoma
5. Thalassemia
6. Leukemia
7. AGN
8. Nephrotic syndrome
9. Peptic ulcer
10. Breast carcinoma
11. Diabetes mellitus
12. Nodular goiter
13. Chronic liver disease
14. Tuberculosis

Teaching of Practical Histopathological Slides-

Name of the teaching slides	Learning objectives	Example in clinical settings
Acute appendicitis	Congestion	Lung, Ovary
	Suppuration	Soft tissue
	Ulcer	GIT, Skin
	Edema	GIT mucosa, Lung, Brain
Tubercular lymphadenitis	Granuloma	LN, Lung, GIT, Kidney, Bone, Brain
	Caseous necrosis	TB
Chronic cholecystitis	Chronic inflammatory cells, Fibrosis	Chronic tonsillitis, Salpingitis, Pyelonephritis
Nodular hyperplasia of prostate	Hyperplasia	Prostate, Endometrium, Liver, Thyroid
Squamous cell carcinoma	Anaplasia Invasion Dysplasia	Skin, Tongue, Esophagus, Cervix, Lung
Leiomyoma	Benign tumor	Lipoma, Fibroadenoma, Hemangioma, Neurofibroma
Cervical polyp	Polyp	GIT, Skin, Nasopharynx
Nodular goiter	Inflammation Hemorrhage Calcification	Fat necrosis, Tuberculosis
Rhinosporidiosis	Infection	TB, Leprosy, Leishmaniasis, Amebiasis, Hydatid cyst
Adenocarcinoma of colon	Adenocarcinoma	GIT, Breast, Lung, Liver, Ovary, Salivary gland

NOTE: TO LEARN THE GROSS MORPHOLOGICAL FEATURES OF DIFFERENT TYPES IN REPRESENTATIVE SPECIMENS-

- 16. APPENDIX-** ACUTE APPENDICITIS/ACUTE INFLAMMATION
- 17. GALL BLADDER-** CHRONIC INFLAMMATION
- 18. POLYP-** GIT(STOMACH/COLON)
- 19. CERVIX-** CARCINOMA
- 20. UTERUS-** LEIOMYOMA
- 21. BREAST-** CARCINOMA
- 22. OBSTRUCTIVE BOWEL DISEASE-** GROWTH IN COLON
- 23. THYROID-** NODULAR GOITER
- 24. BONE-** OSTEOSARCOMA
- 25. LIVER-** CIRRHOSIS
- 26. OVARY-** CYST, TUMOR